

EXHIBIT G

ZONOLITE

pounded. When insulation decomposes, absorbs moisture, becomes infested with vermin, or loses its insulating efficiency after it is installed, it may have to be removed and replaced. That means cleaning out all the old insulation, putting in new insulation, and repairing the walls or ceiling. It means a lot of trouble and expense.

The only way to be sure that this will not happen to you is to select an insulation of proved permanence. Select Zonolite Insulation. Through rigorous testing and extensive usage over many years, Zonolite has proved that it fulfills completely all of the following requirements for good insulation. No other known material can equal such a record.

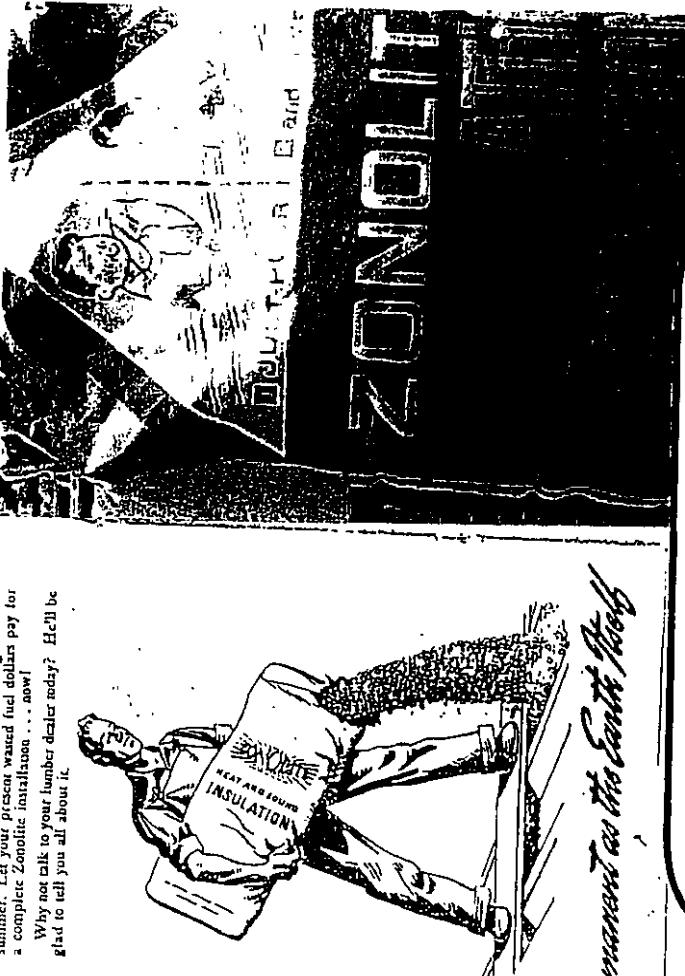
1. Dual Insulation Value . . . Insulates both by air cell conduction and in cellular reflective surfaces.
2. Uniform Tauter-Proof Density . . . Same density installed in the home as when it leaves the factory.
3. Complete Fill . . . Fills walls soundly leaving no voids. (See, No "bulge-up" on rough obstructions, nails, wires, or pipes. Cannot be "blown up."
4. Light in Weight . . . A bag can be handled easily. A six-inch layer of Zonolite weighs only 1½ pounds per square foot of ceiling.
5. Easy to Install . . . No need for mass gloves, or special equipment. It comes in bags and rolls. The average house can be insulated at just a few hours.
6. Chemically Inert . . . Contains no harmful chemicals. Will not damage steel and deteriorate. Will not corrode soft metals. Will not stain wall or plaster. Is practically moisture proof.
7. Fire-proof . . . Not merely are "resistant." It melts at 2400° Fahrenheit.
8. Vermin-proof . . . Mice, rats, insect larvae, or termites will not attack it.
9. Rot-proof . . . Will not decompose nor give off odors. It is a truly "natural" material.
10. Naturally Permanent . . . The permanence of Zonolite is not dependent upon synthetic treatments. It is inherent permanence means effectiveness of insulation for your home forever.

If you are BUILDING A HOME, don't take chances with just insulation. Be sure of permanent, efficient performance. Select Zonolite, the material that fulfills all the requirements for good insulation.

If your present home is not insulated, don't shiver through another winter nor sacrifice through another summer. Let your present wasted fuel dollars pay for a complete Zonolite installation . . . now!

Why not talk to your lumber dealer today? He'll be glad to tell you all about it.

Permanent as the Earth Moves



**"No need for masking
. . . It pours...cleanly."**

**... Contains no
harmful chemicals."**

John Stetts



THE MODERN MIRACLE OF INSULATION



Permanent as the Earth Itself

ZONOLITE

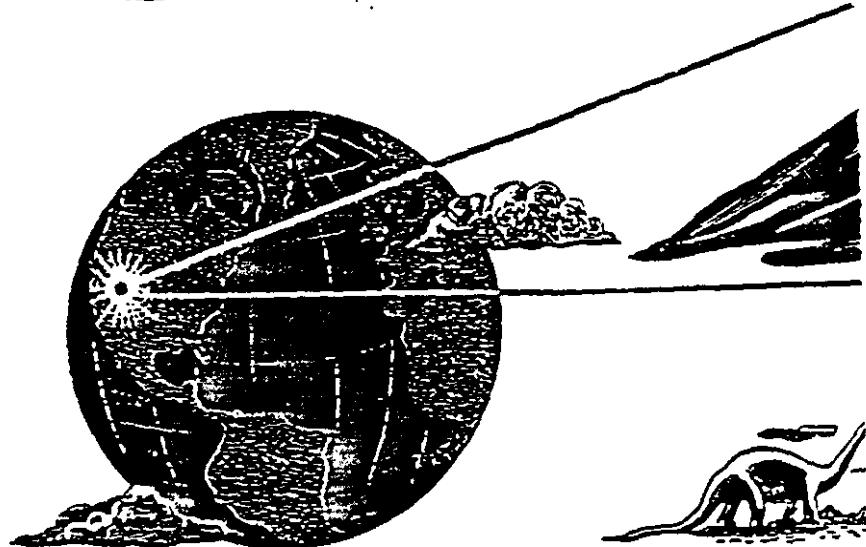
REMEMBER THE STORY of how roast pork was discovered? Back in Ancient China, according to the legend, some fellow's pig pen burned to the ground, and all his pigs with it. After the fire he accidentally stuck his finger into one of the simmering animals. Jamming the smarting finger into his mouth, he was delighted with the taste he found there. That gave him an idea. He spread the word, and soon his neighbors for miles around were burning down their pig pens.



And so roast pork was discovered!



Just a few years ago a discovery equally important was made in much the same way. A group of engineers were seeking mineral deposits in the mountains near Libby, Montana. One day one of the men



Permanent as



accidentally heated what looked like ordinary mica. To his amazement the ore expanded to several times its original size and changed its color as he watched.

Although these engineers didn't know it, on that day they discovered Zonolite—a material which now is used in a thousand ways the world over. Today Zonolite is known as "The Modern Miracle of Insulation."

For six hundred million years the mica-like ore from which Zonolite is made has lain on Mount Zonolite completely unprotected, perfect prey for the destructive forces of time and weather. Rain has drenched it; winter cold has chilled it; forest fires have raged around it; summer sun has blazed down upon it; yet it has stood all these tests without deterioration.

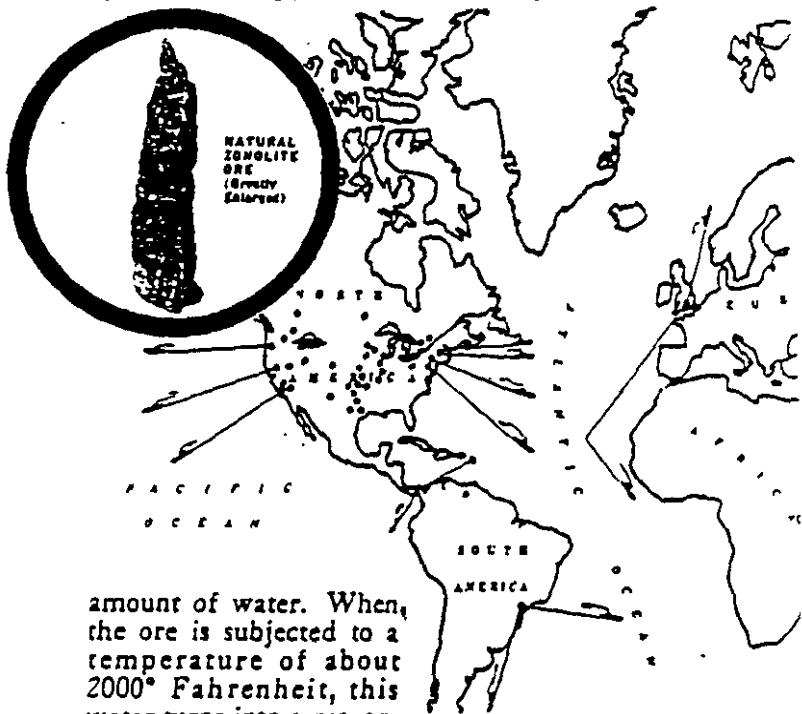


Who knows what prehistoric monsters wandered over Mount Zonolite, how many battles were fought or how many generations of trees grew and died in that spot before a curious engineer accidentally discovered the secret of Zonolite?

In the romantic story of Zonolite there is a clear cut, unimpeachable record of natural permanence that no other insulation has been able to equal.

The Earth Itself

THE METHOD OF CONVERTING the micaceous ore that is dug from the earth at Mount Zonolite into the lightweight, air-filled granular substance that is Zonolite Insulation has changed very little from the first. It is a process of heating, nothing more. Each flake of ore consists of about one million laminations per inch. Trapped between each layer there is a minute



amount of water. When, the ore is subjected to a temperature of about 2000° Fahrenheit, this water turns into a gas, explodes the ore and expands it twelve to fifteen times its original size, producing countless tiny dead air spaces in each granule. In the exploding process the color of the ore changes to a glittering golden brown giving the expanded granules of insulation bright, shiny surfaces which have high heat reflectivity. This reflective quality plus the dead air cell entrapment makes Zonolite the only material having a dual insulating value. It insulates efficiently from sub-zero to 2000° F.

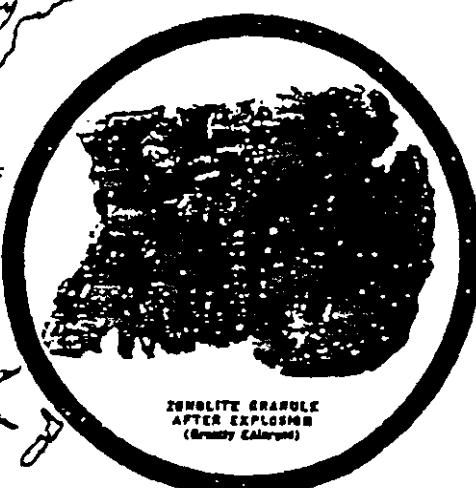
Permanent as



If the engineers who discovered Zonolite could have looked just twenty years into the future they would have seen ore from Mount Zonolite travelling by land and water to Burma, India, Australia, Malaya, England, Canada and South America. They would have seen a vast network of more than fifty Zonolite manufacturing plants, thirteen of them in foreign countries. They

ARCTIC OCEAN

would have seen thousands of homes, office buildings, and factories made comfortable—warmer in winter, cooler in summer—by Zonolite Granu-



lar Fill Insulation. They would have seen Zonolite Insulating Bricks protecting the walls of gigantic furnaces, Zonolite in the walls of great cold storage plants, Zonolite All-Purpose Plaster providing better walls for countless buildings, Zonolite Lightweight Concrete on the roofs of some of the largest buildings in the world. They would have thrilled to see how rapidly new uses are being found for that simple ore that waited six hundred million years to reveal its great secret.

Earth Itself



pounded. When insulation decomposes, absorbs moisture, becomes infested with vermin, or loses its insulating efficiency after it is installed, it may have to be removed and replaced. That means cleaning out all the old insulation, putting in new insulation, and repairing the walls or ceilings. It means a lot of trouble and expense.

The only way to be sure that this will not happen to you is to select an insulation of proved permanence. Select Zonolite Insulation. Through rigorous testing and extensive usage over many years, Zonolite has proved that it fulfills completely all of the following requirements for good insulation. No other known material can equal such a record.

1. Dual Insulation Value . . . Insulates both by its air cell construction and its glittering, reflective surfaces.
2. Uniform Tamper-Proof Density . . . Same density installed in the home as when it leaves the factory.
3. Complete Fill . . . Fills walls solidly leaving no voids. Does not "ball-up" on rough obstructions, nails, wires, or pipes. Cannot be "fluffed up."
4. Light in Weight . . . A bag can be handled easily. A 3-inch layer of Zonolite adds only 1½ pounds per square foot of ceiling.
5. Easy to Install . . . No need for mask, gloves, or special equipment. It pours easily and cleanly. The average home can be insulated in just a few hours.
6. Chemically Inert . . . Contains no harmful chemicals. Will not disintegrate nor deteriorate. Will not corrode any material. Will not stain wall or plaster. Is practically moisture-proof.
7. Fire-proof . . . Not merely fire "resistant." It melts at about 2400° Fahrenheit.
8. Vermin-proof . . . Mice, rats, insect larvae, or termites will not attack it.
9. Rot-proof . . . Will not decompose nor give off odors. It is a 100% mineral material.
10. Naturally Permanent . . . The permanence of Zonolite is not dependent upon synthetic treatments. Its inherent permanence means efficient insulation for your home forever.

with itself



IF YOU ARE BUILDING A HOME, don't take chances with just "insulation." Be sure of permanent, efficient performance. Select Zonolite, the material that fulfills all the requirements for good insulation.

If your present home is not insulated, don't shiver through another winter nor swelter through another summer. Let your present wasted fuel dollars pay for a complete Zonolite installation . . . now!

Why not talk to your lumber dealer today? He'll be glad to tell you all about it.



Permanent as the Earth Itself



INSULATION IS NOW ACCEPTED as an essential part of every building. Home owners, as well as architects and builders, know that it is false economy to try to get along without it. In a recent nationwide survey the respondents were asked to rank in the order of importance to them the reasons why they might insulate their homes. More people gave "because insulation makes homes warmer in winter," than any other reason. Close behind were "because it lowers fuel bills," and "because it makes homes cooler in the summer." Insulation will do all these things. An efficient insulation will pay for itself in actual fuel savings within one to three years.

There are several materials on the market today which, if properly installed, will do an efficient job of insulating for a time. In choosing an insulation it is extremely important to investigate two things:

1. *"Does this insulation automatically assume the correct insulating density when it is installed?"*
2. *"Will it stay forever at maximum efficiency without settlement, rot or disintegration?"*

The efficiency of Zonolite is not dependent upon the chance that it may be installed at the correct density. It cannot be stretched too thin nor compressed too tight. You know what you are getting with Zonolite. The long life of Zonolite is not dependent upon fancy treatments. It is 100% mineral and naturally permanent. You get lasting, uniform insulation with Zonolite.

Don't make the mistake of buying just "insulation." Insulation is a sound investment in comfort, health, money; but poor insulation is a bad investment com-

Permanent as

EXHIBIT H

ZONOLITE[®]

NOW...

Save on fuel,
add comfort

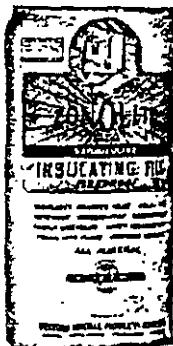


ZONOLITE
Vermiculite
Insulating FILL
Easiest of all to install.
Just pour it, level it,
leave it!
\$1.45
per bag
covers
17 sq. ft. 3" thick

Just pour
it, level it,
leave it!

V-8, Fo

ZONOLITE INSULATING FILL



Zonolite Insulating Fill is used to insulate and sound-deaden side-walls and ceilings of all types of buildings. Zonolite Fill has one of the best insulation factors of any insulation on the market ("K" factor .28 B.t.u.).

Zonolite Insulating Fill comes in 4 cu. ft. bags which weigh about 23 lbs. No special installation equipment is needed. Zonolite Fill is poured from the bag, like popcorn. It flows readily around pipes, wiring, etc., to make a complete, uniform fill without tamping, cutting, or nailing.

Zonolite Insulating Fill is a non-conductor of electricity and can be safely installed over or around electrical wiring. It is rot-proof and does not permit tunneling or nesting by rodents. It does not attract vermin or termites. It is safe to handle because it is non-irritating to the skin and lungs.

It is **safe** to
handle
because it is
non-irritating
to the skin
and lungs.

ZONOLITE® NOW...

Save on fuel,
add comfort



ZONOLITE

Vermiculite
Insulating Fill
Easiest of all to install.
Just pour it, level it,
leave it!

\$1.45

per bag
covers
17 sq. ft. 3" thick



ZONOLITE

Glass Fiber Home
Insulation
Super-efficient...3
thicknesses for every
insulating need.

per M



ZONOLITE

Masonry Fill
Insulation
Double insulating value
of brick and cavity
wall insulation.

\$1.70

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LUMBER CO.

We will be closed Veteran's
Day, Nov. 11

VS

1958 Chev. 4-door Hardtop Se
V-8, Turboglide, Power Steering and Brakes
Rubber, Low Mileage, Radio and Heater,
Glass.

\$1895.00

1958 Ford Fairlane 500

Four-door Hardtop, V-8, Fordomatic, Power
Steering and Brakes, Radio, Heater, Low Mileage.

\$1795.00

1957 Ford Station Wagon

V-8, Fordomatic, Radio, Heater.

\$1450.00

1957 Chev. Wagon

V-8, Straight Stick, Radio, Heater, Good R
Undercoated.

\$1695.00

1956 Buick Special

4-door Hardtop, Power Steering, Brakes and
Heater, V-8 Motor, Brand New Dynaflow.

\$1350.00

Each Car Warranted in Writing

All Cars Winterized

Friendly GMAC Terms

JAQUETH'S, INC.

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Western News
November, 1960

HOW TO DO IT

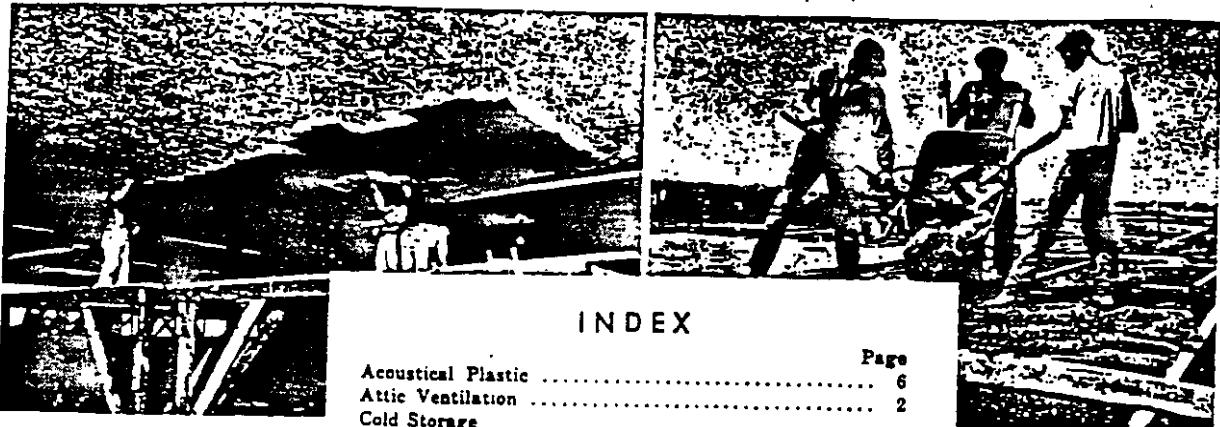
Installing All Forms of Zonolite® Insulations

INSULATION
zonolite
HAND BOOK

© Zonolite is the registered trademark of the Zonolite Co.

THIS booklet is designed to supply "How To Do It" information for installing all forms of Zonolite brand vermiculite. For more technical information or help with special problems, write our Engineering Department.

Zonolite brand of expanded vermiculite is one of the mica minerals. It is fireproof, rot-proof, permanent, and a good insulator against heat and cold. Zonolite Insulations are marketed through lumber and building material dealers.



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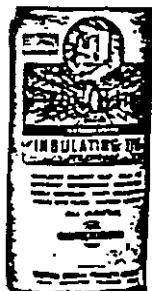
PREFACE

The design data, methods, and specifications for the use of the products outlined in this manual are the result of laboratory research and field tests made under actual service conditions. No attempt is made in this manual to cover each and every specific use to which the Zonolite products described in the manual may be adapted. This is due to the many factors which enter into the field of building construction and engineering, such as weather conditions, design, equipment, standards of labor, steel, cement, and other materials used in combination with, or as accessory to, Zonolite products. Because of such factors, Zonolite Company does not warrant expressly or impliedly the

use of the materials described in this manual, or the results that may be obtained from the use of specifications, design data, and methods herein outlined. Due to the variable conditions which may be encountered on any particular job, and the different results that may be obtained from the use of other materials used in combination with, or accessory to, the Zonolite products listed herein, it is our intent in the publication of the specifications, methods, and design data contained herein to furnish a guide only for architects, engineers, contractors, plasterers, and fabricators in adapting Zonolite products to their particular requirements.

ZONOLITE Brand Vermiculite
Sold by Lumber and Building Material Dealers Everywhere

ZONOLITE INSULATING FILL



Zonolite Insulating Fill is used to insulate and sound-deaden side-walls and ceilings of all types of buildings. Zonolite Fill has one of the best insulation factors of any insulation on the market ("K" factor .28 B.t.u.).

Zonolite Insulating Fill comes in 4 cu. ft. bags which weigh about 23 lbs. No special installation equipment is needed.

Zonolite Fill is poured from the bag, like popcorn. It flows readily around pipes, wiring, etc., to make a complete, uniform fill without tamping, cutting, or nailing.

Zonolite Insulating Fill is a non-conductor of electricity and can be safely installed over or around electrical wiring. It is rot-proof and does not permit tunneling or nesting by rodents. It does not attract vermin or termites. It is safe to handle because it is non-irritating to the skin and lungs.

Zonolite Insulating Fill is a natural mineral that will not draw moisture from the atmosphere. In the event of a roof leak, water will be readily picked up by the Zonolite, and held until conditions are right for it to dry.

The approximate coverage of Zonolite Insulating Fill is as follows:

Thickness in inches	2"	3"	3 1/4"	4"	5 1/4"
Coverage per bag in sq. ft.					
based upon joists spaced 16" on center	26	17	14	13	9

A thickness of 3 1/4", with a minimum of 3", is recommended. Insulation is installed for two reasons: to keep out summer heat, and to keep heat within the building in winter. Both purposes are served better with thick insulation. The low cost of Zonolite makes possible this greater thickness for essentially the same cost as the 1" or 2" recommended by manufacturers of higher-priced materials.

INSTALLING ZONOLITE INSULATING FILL

Side-walls: Check attic to see if Zonolite can be poured into side-walls directly from attic. If walls are open (balloon construction), drop a weight on a line into each stud space, to determine where fire-stops or headers would prevent the Zonolite from going clear to the foundation. After these are located, pour Zonolite into side-walls.

If construction is such that a plate at the ceiling line blocks off the side-wall, it may be possible to bore a 1 1/2" hole through this plate between each studding space. Check wall for fire-stops and headers with a weight on a line. Pour Zonolite Insulating Fill over the holes which have been bored, allowing it to run into side-walls until walls are completely filled. This eliminates the necessity of removing siding from the outside, except below windows and where fire-stops occur, particularly important in stucco or brick-veneer construction.

If Zonolite cannot be installed from attic, entry can be effected from outside. Remove a row of siding.

Approximate Number of Bags of Zonolite to Cover Flat Ceilings to Full Depth of 2" x 4" Joists 16" O.C.																		
Ft.	18'	20'	22'	24'	26'	28'	30'	32'	34'	36'	38'	40'	42'	44'	46'	48'	50'	
18'	23	25	28	30	32	35	37	40	42	45	47	50	52	55	57	60	62	
20'	25	28	31	33	36	38	41	44	47	50	53	55	58	61	64	66	69	
22'	28	31	33	37	39	43	46	49	52	55	58	61	64	67	70	73	76	
24'	30	33	37	40	43	47	50	53	57	60	64	67	70	73	76	80	83	
26'	32	36	39	43	47	50	54	57	61	64	68	72	76	79	83	86	90	
28'	35	38	43	47	50	54	58	62	66	70	74	78	82	85	89	93	97	
30'	37	41	46	50	54	58	62	66	70	75	79	83	87	91	95	99	102	
32'	40	44	49	53	57	62	66	70	75	80	84	88	93	97	102	106	110	
34'	42	47	52	57	61	66	70	75	80	84	89	94	99	104	108	113	117	
36'	45	50	55	60	64	70	75	80	84	89	95	100	105	110	115	120	125	
38'	47	53	58	64	68	74	79	84	89	95	100	105	110	116	121	126	131	
40'	50	55	61	67	72	78	83	88	94	100	105	110	116	121	127	133	138	

To find number of bags for other than 3 1/4" thickness, multiply number of bags shown in table by following factors:

For 3" Multiply by .83
For 4" Multiply by 1.1
For 5 1/4" Multiply by 1.55

and sheathing at ceiling line all around the building. Drop a weight on a line into each exposed studding space to determine location of fire-stops and headers. Pour Zonolite directly from bag into walls. A simple home-made trough facilitates pouring Zonolite and eliminates spilling. To insure a complete fill below plaster clinches and other obstructions, vibrate wall slightly with a rubber mallet or short 2 by 4 as Zonolite is poured in.

Zonolite Insulating Fill (Continued)



Installing Zonolite Fill below window

It is important that walls be completely filled to top. In some cases, this can be done by tacking building paper to the exposed portion of the studs, allowing top edge of paper to flare. Pour Zonolite behind this paper, and press paper and insulation into place. Replace sheathing and siding. If this method is not possible, due to an over-hanging eave, top portion of walls can be filled by hand-packing fibre insulation.

It is important to insulate below windows and fire-stops located as outlined previously. Procedure for insulating these locations is exactly the same as for insulating walls from the outside.

BALLOON CONSTRUCTION: In new construction, the installation of Zonolite is made very simple by constructing the wall open from attic or loft, by putting the 2 by 4 plate on top of ceiling joists, rather than below. This allows Zonolite to be poured from attic down into walls after the studs have been sheathed and lathed. Contractors using this method say that Zonolite can be installed faster than any other type of insulation: no cutting, no fitting, no tacking; just let it run down into the open wall space.

Another advantage of using balloon type construction is that Zonolite can be poured down wall after plaster has had a chance to dry thoroughly. Drying is accelerated by circulation of air on both sides of the lath and plaster. This saves time for the contractor and allows casing to be done sooner with safety because the plaster has dried faster.

Page 2

Zonolite Fill should be poured under window openings as the lath or other lining is installed.

Vapor Barriers: A vapor barrier will help maintain desirable humidity within the rooms and is good construction practice. It should be installed on the inside (warm side) of the wall. The vapor barrier should consist of a glossy-surfaced, asphalt-impregnated building paper nailed to the studs before the lath is applied. Use Treated Sisalkraft, Bird's Neponsit, Ruberoid's Giant Sheathing, or equal. Foil-backed rock-lath provides good vapor resistance. Due to the joints between the lath, it is not so effective as a good vapor-proof paper, but it has the advantage of being easier to apply.

Unfloored Attics: Pour Zonolite Insulating Fill into each joist channel, and level off to proper depth with a wooden screed. Minimum thickness should be 3".

Floored Attics: Remove two or three floor boards at convenient intervals, push Zonolite under floor with rake, and level.

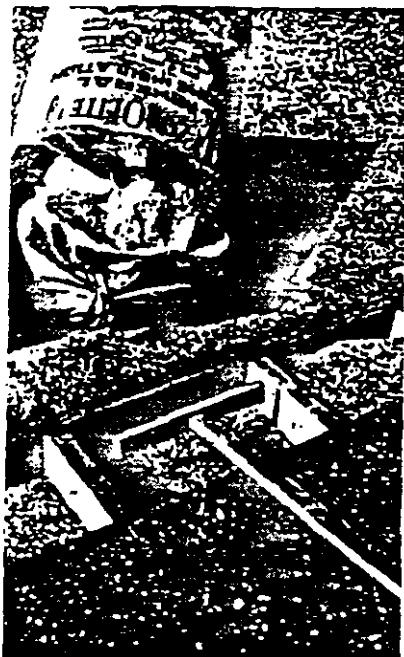
To reach inaccessible attic areas or pockets, make small openings in the roof.

Attic Ventilation: Installation of louvers is good construction practice. The number of louvers is governed by the size of the structure. The ideal condition is to provide 1 sq. ft. of ventilator to each 200 sq. ft. of attic area.



Leveling Zonolite Fill in attic

Zonolite Insulating Fill (Continued)



Opening in flat roof for Zonolite installation

Flat Roofs: If the clearance under lowest portion of roof does not allow sufficient working space, make an opening through roof. Opening should be 2 ft. wide, beginning at lowest point in roof at the center, and extending as far as necessary toward high end. Pour Zonolite between joists, and rake or push laterally to either side-wall to desired level and depth. If building is too wide to cover from one opening, additional openings should be made in same manner. Carefully reseal roof opening.

Sound-Deadening: When sound-deadening partition walls, studs should be staggered so they are not continuous through the wall. One set of studs is placed to support one side of the partition, and a separate set of studs is placed for the opposite side of the wall, so that solid wood does not extend through partition. Wall is then filled with Zonolite. The sound-deadened wall can be maintained at normal thickness by using 2" by 3" studs. A wall of this thickness will provide satisfactory results except in extreme cases. Good sound-deadening results between floors can be obtained by providing a set of joists to support the ceiling, separate from joists supporting the floor above, and placing approximately 4" of Zonolite Fill over the ceiling.

Animal Shelters: Existing animal shelters which are cold or in which excessive condensation occurs can be made warm and dry by the addition of Zonolite Insulating Fill in side-walls and ceiling, a Zonolite Insulating Concrete floor (See page 9), and an efficient ventilating system.

In buildings of wood construction, nail vapor barrier, described previously, to inside of studding and ceiling joists. Over this apply the lining (asbestos board, treated gypsum board, or lumber). Pour Zonolite Fill into cavity as lining is installed.

In existing buildings of masonry construction, furr out side-walls with 2" by 3" furring strips well anchored to the wall. Tack vapor barrier to furring strips. Pour Zonolite 3" thick into cavity as lining is applied over vapor barrier. Apply vapor barrier and lining on ceiling joists, and insulate between the joists with 3" or more of Zonolite.

It is a mistake to think that only double boarding outside the studs will sufficiently insulate the side walls. This "double boarding" method is questioned by many. Cora Cooke, University of Minnesota Agriculture Extension Service, says:

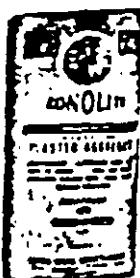
"It is known from experience that double-boarding outside the studding is far from adequate. The improvement in insulating value made when the layers of boards are nailed to the inside and outside of the studding is slight, and the room is still subject to rapid changes in temperature. The air space thus provided is far less effective as an insulator than is commonly supposed. Fill materials offer a very practical solution." (POULTRY HOUSING, by Cora Cooke.)



Warm, dry Zonolite Concrete floors reduce freezing loss

ZONOLITE PLASTER

(Covered More Completely in Folder PA-2)



Zonolite Plaster Aggregate is a specially-sized vermiculite aggregate to be used in place of sand. When mixed with gypsum, it produces a plaster that is light in weight, has good insulation value, and provides remarkable fire protection.

Zonolite Plaster was the first material on the market to obtain official 4-hour fire ratings for protecting steel floors, roofs, beams, trusses, and girders with a 1" application. (Vermiculite Institute fireproofing booklet available on request.)

Zonolite Plaster on the wall weighs less than one-third as much as sand plaster. Five bags of Zonolite Aggregate (180 lbs.) replace 2,000 lbs. of sand.

Zonolite Plaster has more than three times the insulating value of sand plaster. It has a "K" factor of .95, compared with 3.3 for sand plaster.

Zonolite is the most uniform aggregate available for plaster. It meets A.S.T.M. Standard Specifications, and carries the Underwriters' Laboratories seal. This means that the material is examined at regular periods for screen analysis, density, and absence of impurities.

Zonolite Plaster Aggregate bags contain 4 cu. ft. and weigh about 32 lbs.

THICKNESS (RECOMMENDED MINIMUM)

Base	
Gypsum Lath $\frac{1}{2}$ "
Metal Lath $\frac{3}{4}$ "
Masonry $\frac{5}{8}$ "

For estimating purposes, $\frac{1}{2}$ " Zonolite Plaster over gypsum lath, figure 6 bags Zonolite, 9 bags gypsum plaster per 100 square yards.

Materials required over masonry and metal lath bases will depend on the evenness of the wall and the depth of the key.

Zonolite Plaster is applied exactly as sand plaster. One-coat browning is satisfactory over gypsum lath. When other types of lath are used, apply scratch and brown coats. Allow scratch coat to set before applying brown coat.

MIXING AND APPLICATION

The following mixes, on a bag basis, assure accurate proportioning. They are in complete agreement with American Standards Association specifications.

Only sufficient water to make a workable mix shall be added. Water shall be fresh and of potable quality.

Over Gypsum Lath

(One Coat Browning)

1 bag	Zonolite Plaster Aggregate
$\frac{1}{2}$ to 2 (100 lb.) bags	Gypsum Neat Plaster

Over All Other Lath

Scratch Coat:

1 bag	Zonolite Plaster Aggregate
2 (100 lb.) bags	Gypsum Neat Plaster

Brown Coat:

1 bag	Zonolite Plaster Aggregate
$\frac{1}{2}$ to $\frac{1}{2}$ (100 lb.) bags	Gypsum Neat Plaster

Insulation Lath: Care should be taken that first coat of plaster applied to insulation lath sets within 1 to 2 hours. Fiber insulation lath should not be wet down prior to receiving plaster. Thickness of plaster should not be less than $\frac{1}{2}$ ". Plasterer should guard against grounds that are too thin.

Over Masonry

(Scratch and Brown Coat)

1 bag	Zonolite Plaster Aggregate
$\frac{1}{2}$ to $\frac{1}{2}$ (100 lb.) bags	Gypsum Neat Plaster

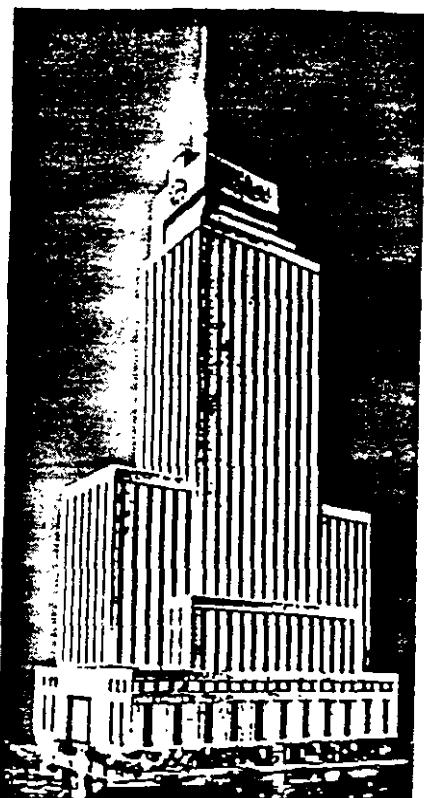
In plastering over masonry bases that exhibit high suction, it may be necessary to increase aggregate content. Under no circumstances should more than 1 bag of Zonolite Aggregate be mixed with 100 lbs. of gypsum plaster.

When Zonolite Plaster is applied directly to monolithic concrete surfaces, concrete should first be coated with a specially-prepared bond plaster for use on concrete. Aggregate shall not be added.

Avoid bituminous plaster bond.



Prescribing steel beams with 1" of Zonolite Plaster



Mercantile Bank Bldg., Dallas, Tex., Prepared with
Zonolite Plaster



Zonolite Plaster Finish Aggregate is a fine-sized vermiculite for trowel finish only. It shall be mixed with unfibred gypsum plaster.

Zonolite Plaster Finish provides a hard finish coat with a pleasing tan cast. Gypsum-to-gypsum application assures the strongest possible bond to the base coat.

Plasterers favor Zonolite Plaster Finish for a number of reasons: primarily, because it eliminates the time-consuming hand operation of mixing lime and gypsum gauging plaster. All mixing is done by the tender.

Zonolite Plaster Finish Aggregate is packed in 2 cu. ft. bags that weigh about 22 lbs.

STANDARD PROPORTIONS

1 bag (2 cu. ft.)	Zonolite Finish Aggregate
2 bags (100 lbs. each)	Unfibred Gypsum Plaster
16 gals. (Approx.)	Water

This batch will cover approximately 40 yds.

MIXING AND APPLICATION

Place approximate amount of water in mixing box. Spread gypsum plaster over water, and allow to soak.

Zonolite Plaster (Continued)

SETTING TIME

Gypsum manufacturers adjust the set of gypsum to fit local sand conditions by adding varying quantities of retarder. If a strongly retarded gypsum is used with Zonolite, a slow set may be encountered. Plaster should set in 3 to 6 hours. Delay of set may cause excessive shrinkage, resulting in cracked plaster. To avoid slow set, add a small quantity of commercial accelerator to mix, amount easily determined on job. On large jobs, the gypsum company should be advised that vermiculite aggregate is to be used.

FINISH COATS

Any of the conventional plaster finishes, such as lime putty or sand float, may be applied over a brown coat of Zonolite Plaster. (See Zonolite Plaster Finish and Acoustical Plastic.) Zonolite Plaster develops suction faster than sand plaster. Finish coat should be applied to a Zonolite base coat that is semi-green. If brown coat is dry, it shall be evenly wetted but not saturated. Too much water in brown coat may cause blistering.

TEMPERATURE AND VENTILATION

Plaster shall not be applied to surfaces that contain frost. A minimum temperature of 40° F. shall be maintained prior to and during application of plaster, and until it is completely dry. Protect fresh plaster from excessive heat, and provide adequate ventilation. Drying should commence immediately after plaster has set, and be continuous until thoroughly dry. Temperatures as uniform as possible shall be maintained during drying period. Prevent dry-outs prior to set by screening openings in hot weather.

For additional information, see American Standards Association, "Standard Specifications for Gypsum Plastering," 70 E. 45th St., New York 17, N. Y.

ZONOLITE PLASTER FINISH

(Covered More Completely in AD-3)

After all dry plaster has been taken up by the water, add Zonolite Finish Aggregate, and mix thoroughly. Add more water as necessary to obtain workable consistency.

Zonolite Plaster Finish shall be applied over a base coat in a semi-green condition. If brown coat is dry, it should be evenly wetted, but not saturated. Too much water in brown coat may cause blistering. The thickness of Zonolite Plaster Finish shall be from 1/16 to 1/8 inch. Additional thickness is permissible to level uneven base coat.

Zonolite Plaster Finish is applied the same as a putty coat. A tight scratch is first applied and allowed to draw. This is followed by a fill-in coat, troweled with water to a smooth finish, free from cat faces and other blemishes.

Provide adequate heat and ventilation, and observe usual precautions to prevent dry-outs.

PAINTING

Oil-base paints should not be applied to any plaster until it is dry. If immediate decoration is desired, use water-base paint.

Zonolite Plaster Finish produces more suction than other smooth finishes, and adequate sizing is recommended.

ZONOLITE ACOUSTICAL PLASTIC

(Covered More Completely in Folder PA-5)



Zonolite Acoustical Plastic is a ready-mixed acoustical plaster that requires only the addition of water. It can be troweled over any clean, firm, water-resistant surface, such as brown coat plaster, masonry walls, oil-painted surfaces, etc. It is easily applied to irregular surfaces.

Zonolite Acoustical Plastic has a noise reduction coefficient of .65 for a $\frac{1}{2}$ inch thickness. In effect this means that 65% of noise is absorbed. Few other acoustical materials of equivalent thickness provide as much sound absorption.

Zonolite Acoustical Plastic is FIREPROOF. Combustible ceilings in public buildings are hazardous. Protect this critical area from flash fires with Zonolite Acoustical Plastic.

One bag of Zonolite Acoustical Plastic will cover approximately 4 sq. yds. $\frac{1}{2}$ " thick. Mix with approximately 10 gals. of water for good consistency.

MIXING

Pour water into a clean mixing box or mechanical mixer. Add dry Zonolite Acoustical Plastic, and mix thoroughly. Allow to soak 30 minutes, and re-mix prior to application. No set takes place with Zonolite Acoustical Plastic; therefore, large quantities can be mixed ahead and may stand in the mixing box over night.

WATERPROOFING

When installation is made above swimming pools, directly to cold surfaces where condensation may develop, or other places where damp conditions exist, specify plain Acoustical Plastic (to which no pigment has been added). Add Zonolite Waterproofing Admix in the proportion of 1 qt. of Admix to each bag of Zonolite Acoustical Plastic. The order of mixing is then: Water, Admix, and Zonolite Acoustical Plastic. Admix and water must be stirred together before Acoustical Plastic is added.

The Admix will darken the color of the finished plastic.

Page 4

APPLICATION

Apply in two coats, each about $\frac{1}{4}$ " thick, to a finished thickness of $\frac{1}{2}$ ". Allow first coat to dry before applying second coat. A dry first coat assures a finer texture in finish coat.

Surface may be left under an aluminum or smooth wooden darby. If a finer texture is desired, trowel lightly day after finish is applied. Darby or trowel finish coat in one direction only. Varied textures may be obtained by floating or stippling while wet. Any material left loose by stippling should be pressed back into place by troweling lightly.

To avoid joinings, use sufficient plasterers to complete entire area in one operation. If dry joinings are unavoidable, thoroughly wet back 3 ft. of previous application, and join as though application were continuous.

PAINTING

The new Zonolite Acoustical Plastic is a pleasing off-white and may be satisfactory without further decoration. Where colors are desired, or to obtain a whiter appearance, spray paint with non-bridging, water-thinned resin emulsion or casein paint, such as Kemtone, Texolite, or Spred. Thin each gallon of paint with about 1 gal. of water. Paint may be brushed on, but spray painting is preferable.

Initial decoration and redecoration will not reduce the sound-absorption coefficient provided properly thinned water-base paint is used.



Zonolite Acoustical Plastic Ceiling, school room

ZONOLITE INSULATING CONCRETE

(Covered More Completely in Concrete Manual CA-1)



Zonolite Insulating Concrete, the lightest of all mineral concretes, is a mixture of Portland cement, Zonolite Concrete Aggregate, and water. Its principal uses are:

Floors:	Grade level floor insulation Lightweight floor fills Insulation below radiant heat pipes and ducts Cold storage Farm buildings	Roof Construction:	Lightweight decks Insulating fills Slope to drains; cants, saddles, crickets
Tanks:	Milk cooling	Masonry Wall Insulation: Double (Cavity) Single unit	

Properties of Zonolite Concrete Mixes and Materials Required for 1 cu. yd. of Placed Concrete:

Mix by Volume			Density in Lbs. Per Cubic Foot	Strength in Pounds Per Square Inch		Thermal Conductivity ("K") in B.t.u. Per Inch Thickness Per Sq. Ft. Per Hour Per Degree F.	*Approximate Quantities Required for One Cu. Yd. of Placed Zonolite Concrete		
Bags Portland Cement	Cu. Ft. Zonolite Concrete Aggregate	Gallons Water		Compressive Strength 1" Due on 4"x12" Cylinders	Indentation Strength 1" Due on 1"x12"x12" Slab		Bags Portland Cement	Bags Zonolite Concrete Aggregate	Gallons Water
1	4	12	35	325	350	0.97	7½	7½	85 to 95
1	6	18	25	125	160	0.76	5	7½	85 to 95
1	8	24	22	70	121	0.60	3¾	7½	85 to 95
1	16	48	16	11	28	0.46	1¾	7½	85 to 95

(Each bag of Zonolite Concrete Aggregate contains approximately 4 cu. ft.)

*A wet mix is recommended, a 6" to 9" slump as measured by a standard slump cone.

*These figures are recommended for estimating purposes. Allowance must be made for sag in forms and loss in mixing and placing.

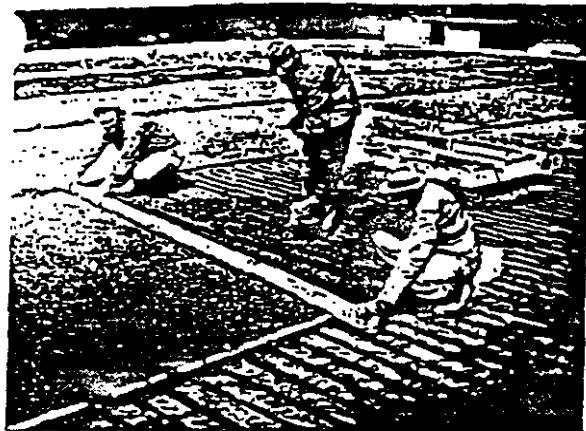
MIXING AND PLACING ZONOLITE CONCRETE

Job Mixed: Zonolite Concrete shall be mixed in a mechanical mixer, preferably of the paddle type which has a stationary drum with rotating paddles. Any sequence of charging the mixer is satisfactory which results in all water and all aggregate coming together at one time. The yield of concrete will be reduced if either water or aggregate is added slowly while mixing continues. Mix to uniform and pourable consistency (approximately 3 minutes). Place the mixed concrete promptly to avoid any change in slump or consistency.

Transit Mixed:

1. Place all water, cement, and aggregate (in this order if possible) for required batch in the mixer.
2. Turn drum at plant only enough to obtain uniform mix.
3. Do not turn drum while driving from plant to job.
4. At job, remix approximately 1 minute. Add water if necessary to obtain 6" to 9" slump. Over-mixing or delay in placing will result in low yield.

Zonolite Insulating Concrete (Continued)



Typical finished surface after screeding

FINISHING

Zonolite Concrete shall be placed in panels of a width capable of being screeded and finished. Screeding usually provides the desired finish. A smoother finish may be obtained by floating. Troweling is unnecessary and is not recommended.

CURING ZONOLITE CONCRETE

The curing of any concrete is particularly important. Cement becomes a strong binder only because of its chemical reaction with water. To allow the cement and water to complete the chemical reaction and to prevent the water in the mix from escaping, surface curing is necessary.

The following methods of curing sand-and-gravel concrete apply also to Zonolite Concrete:

Warm and Hot Weather Construction:

1. Keep the surface constantly wet with water for three days. A covering of wet burlap or wet canvas may be used. The covering is placed as soon as it can be done without marring the surface, care being taken to keep covering continuously wet by sprinkling. When a cover is not used, sprinkling is begun as soon as the concrete has set.

2. Ponding is a good method of curing for flat surfaces, such as floors and roofs. With this method, the surface to be cured is surrounded by small earth dikes, and kept flooded with water for about three days.

3. Another method suitable for curing concrete is the use of asphalt curing compounds which prevent rapid evaporation of the mixing water needed for proper hydration of the cement. These coatings are sprayed on immediately after the free water has disappeared from the concrete's surface. Follow manufacturer's recommendations for coverage. The surface must be well coated with asphalt.

Cold Weather Construction:

It is not advisable to place Zonolite Concrete if temperatures below 30° F. are expected within two or three days. If job conditions are such that it is necessary to place Zonolite Concrete in temperatures below 30° F., the following precautions should be observed:

1. Use high early strength cement.
2. The concrete must be placed in the forms at a temperature of not less than 60° F. nor more than 80° F. This is accomplished by heating the mixing water, taking care that water is not heated to more than 175° F.
3. After the concrete is placed, it must be kept from freezing for at least five days. Cover with heavy paper, and then with hay or straw. Provide heat with steam, if available, or with some form of salamander. Do not place salamanders too near the fresh concrete to cause rapid drying.

The strength gain of any concrete is slow at low temperatures. For this reason, the temperature of the concrete should be maintained above 50° if possible. The effect of temperature is given by the following data from the American Concrete Institute:

Average Air Temperature	Days to Reach Equal Strength
70° F.	7 days
60° F.	15 days
50° F.	23 days
40° F.	31 days

The fresh concrete must be protected against damage from other construction activity. The length of time such protection will be required depends entirely upon the temperatures and moisture present during the early stages of curing.



Radiant heat pipes on Zonolite Insulating Concrete

ZONOLITE CONCRETE FLOORS

Zonolite Insulating Concrete floors provide efficient thermal insulation in heated buildings, in refrigerated buildings, and in animal shelters. Zonolite Concrete floors are fireproof, rot-proof, permanent, and easily installed.

Drainage: Provide adequate drainage in all types of floor construction.

Animal Shelters: Properly installed, Zonolite Concrete floors will remain dry, even in animal shelters where relative humidity is unusually high. They can be quickly installed in old or new structures.



New Floors: Fill area with gravel to within 3" of top of concrete footings. Place 3" thick slab of Zonolite Insulating Concrete, 1-to-6 mix, level with top of footing or sill. Allow to stand over night to set. Place 2" of sand concrete topping for permanent wearing surface.

1-to-6	1½ bags	Zonolite Concrete Aggregate
Mix	1 bag	Portland cement
	18 gal.	Water (Approx.)

This mix will cover approximately 22 sq. ft. 3" thick.

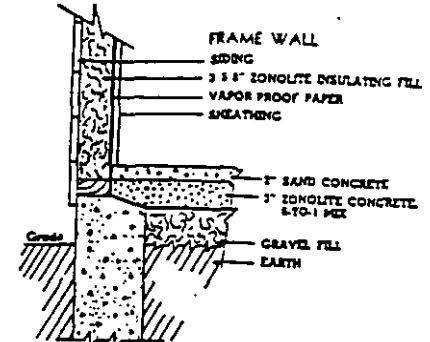
Existing Floors: Lay heavy, asphalt-impregnated roofing paper over old floor of ordinary concrete or tile. Place 3" thick slab of Zonolite Insulating Concrete, 1-to-6 mix. Allow to stand over night to set. Place 2" of sand concrete topping for permanent wearing surface.

Grade Level and Radiant Heat Floors: (Covered More Completely in Folder CA-4.) Fill floor area with gravel to within 4" of top of concrete footing. Lay the vapor barrier over gravel fill. Vapor barrier should consist of two layers of glossy-surfaced, asphalt-impregnated paper with edges lapped 4" and sealed (Treated Sisalkraft, Bird's Neponset, Ruberoid's Giant Sheathing Paper, or equal), or two layers of tarred felt in three moppings of hot pitch. Place Zonolite Insulating Concrete, 1-to-6 mix, level with top of footing.

1-to-6	1½ bags	Zonolite Concrete Aggregate
Mix	1 bag	Portland cement
	18 gal.	Water (Approx.)

This mix will cover approximately 16 sq. ft. 4" thick.

Radiant heating pipes or ducts, where used, are laid on the Zonolite Concrete slab, and covered with a



Detail, Farm Building Floor

sand concrete slab to a thickness of 1" above the pipes. A light wire mesh embedded in the sand concrete topping minimizes cracking.

Design the topping to carry the anticipated load. Minimum thickness, 2".

Cold Storage Floors: (Covered More Completely in Cold Storage Manual CS-1.)

For best results, the floor should be constructed above ground with air circulation below. Floors directly on the ground are satisfactory for room temperatures above 20° F. Make sure of good drainage away from the under side of floor (see Zonolite fill floors, page 12, for temperatures below 20°). If in doubt, consult our Engineering Department.

First provide structural floor capable of carrying floor loads. Over this place a good VAPOR BARRIER—2 layers of tarred felt mopped in hot pitch. Next, place required thickness of Zonolite Concrete, 1-to-8 mix, as per table below:

Temperature	Recommended Thickness	
	On Ground	Above Ground
Above 50°	4"	4"
50 - 35	6"	6"
35 - 20	8"	8"
20 - 10	—	10"
10 - 0	—	12"
0 - -10	—	14"
Below -10	—	16"

1-to-8	2 bags	Zonolite Concrete Aggregate
Mix	1 bag	Portland cement
24 gal. Water (Approx.)		

This mix makes approximately 7 cu. ft. of concrete.

After the Zonolite Concrete has set and become dry, broom the surface clean and apply sand concrete topping capable of supporting anticipated loads. Minimum thickness, 2". Do not mix topping too rich. 1 part cement, 3 parts sand, 2 parts pea gravel is recommended. A reinforcing mesh in the topping is recommended to minimize shrinkage cracks.

Moisture present in the concrete at time refrigeration is turned on will gradually be drawn to the refrigerating coils.

ZONOLITE CONCRETE ROOF DECKS AND INSULATION

Zonolite Insulating Concrete has gained wide recognition in recent years as efficient roof insulation. It does not rot, disintegrate, or burn. There are no joints to open up. The insulation, including cants, saddles, and crickets, may be placed monolithically all at one time. Roof leaks will not deteriorate Zonolite Concrete because it is not affected by moisture. The customary built-up roof of asphalt or pitch-and-gravel is applied over the Zonolite Concrete slab after it has set and dried out.

ROOF DECKS.

(Covered More Completely in Folder CA-5)

Support: Zonolite Concrete can be used effectively as the roof deck where joists or other support is provided at close spacing—up to 32". Where joists or purlins are widely spaced, a sub-purlin (usually a light "T" section) may be incorporated to provide proper spacing for support.

Insulation Value: A 3" Zonolite Concrete deck will provide a U factor for the roof of .24. Greater insulation values can be provided by increasing the thickness.

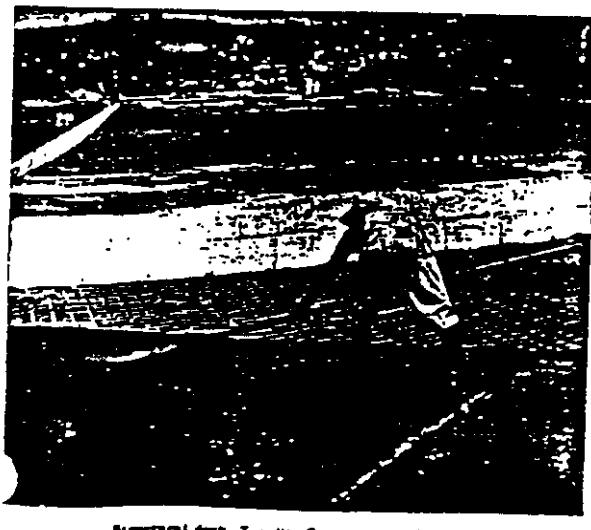
Strength: The strength of Zonolite Concrete decks depends upon the joist spacing, type of form and reinforcing used, and thickness of slab. The construction recommended will provide for 50 lbs. live load with an excellent safety factor.

Joist Spacing	Min. Slab Thickness
Up to 16"	2"
16" to 24"	2½"
24" to 32"	3"

The 1-to-4 mix is recommended.

1-to-4 Mix	1 bag Zonolite Concrete Aggregate 1 bag Portland cement 12 gals. Water (Approx.)
This mix will cover approximately 14 sq. ft. 3" thick.	

Forms: Permanent form material is recommended. The form shall be stiff enough to support the fresh



concrete until it has set. Paper-backed wire mesh (Steeltex), high rib metal lath, corrugated sheet steel, asbestos board, and some types of insulation boards provide satisfactory forming.

Reinforcing: High rib metal lath and Steeltex provide necessary reinforcing for the deck. When other types of form material are used, a reinforcing mesh must be embedded in the lower half of the slab. Use a 6"x6"x10 gauge welded wire mesh or equal.

ROOF INSULATION

(Covered More Completely in Folder CA-2)

Zonolite Concrete roof insulation is placed over a structural roof deck, such as concrete, steel, tile, wood, etc. If applied over a wood deck, cover the wood with a layer of waterproof paper before placing the concrete. The structural deck may be designed dead level. The lightweight Zonolite Concrete may be placed sloping to the drains. Thickness of the Zonolite Concrete shall be designed to provide the insulation value and/or drainage desired—minimum thickness, 2".

The 1-to-6 mix is recommended.

1-to-6 Mix	1½ bags Zonolite Concrete Aggregate 1 bag Portland cement 18 gals. Water (Approx.)
This mix will cover approximately 16 sq. ft. 4" thick.	

ROOFING

APPLICATION OF BUILT-UP ROOFING: A Zonolite Concrete roof deck is ready for built-up roofing when it has developed the following characteristics:

1. Surface Hardness: Hardness of the surface shall be considered adequate when it will withstand foot traffic and other light operations of roofing, without damage; but it must be protected from gouging or excessive loads.

2. Surface Finish: Surface shall be firmly bound and free from loose material. The screeded surface finish shall be free from any extreme roughness capable of interfering with proper bonding of the felt.

3. Surface Dryness: The exposed surface shall look and feel substantially dry, and have a uniform gray-cement color. When in this state, the hot mopped bond coat will go on smoothly without frothing, and will adhere well to the surface.

..7



REALLY STOPS HEAT



**THE MODERN MIRACLE
OF INSULATION**

FIRST PRINTING - MARCH, 1948
SECOND PRINTING - JUNE, 1948
THIRD PRINTING - JANUARY, 1949
FOURTH PRINTING - JULY, 1949
FIFTH PRINTING - JANUARY, 1950

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INSULATION

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Zonolite®

Vermiculite Attic Insulation



PROPERTIES

- Easy to install**—Just open the bag, pour Zonolite, level it.
- *Fire resistant**—All mineral, won't burn.
- Rot and vermin resistant**—Inorganic, no food value to support animal life.
- Fills solidly**—Pours freely around obstructions. Fits snugly against attic joists.
- Non-settling**—Holds its full thickness under most severe conditions.
- Permanent as the earth itself**. Lasts the life of the building. Need never be replaced.
- Non-irritating**—Will not cause skin irritation common with other types of insulation.
- Economical, efficient**—Low initial cost, plus yearly savings that pay for the insulation in as little as three heating seasons.

Underwriter's Laboratories Inc. Fire Hazard Classification
Vermiculite Attic Insulation
Flame Spread _____
Fuel Contribution _____
Smoke Developed _____

Homeowners can re-insulate their attics in only a few hours. New, clean, easy-to-handle Zonolite bags can be carried home in a car.

Zonolite Vermiculite Attic Insulation is a free-flowing granular mineral well suited to insulation of horizontal areas such as attics. When installed to recommended thicknesses, it sharply reduces heating and cooling costs, and greatly increases personal comfort.

Packed in convenient lightweight bags, Zonolite Attic Insulation is simply poured between joists and leveled to desired thickness. One man can usually insulate the average home attic in two to four hours.

Zonolite can be poured over existing insulations which are of insufficient thickness due to improper installation or settling. Many homes lack proper thickness of insulation, with resultant waste in fuel or electricity, and sacrifice of comfort. Zonolite will protect underlying combustible insulations and fill voids along joists, around wiring, pipes, or braces.

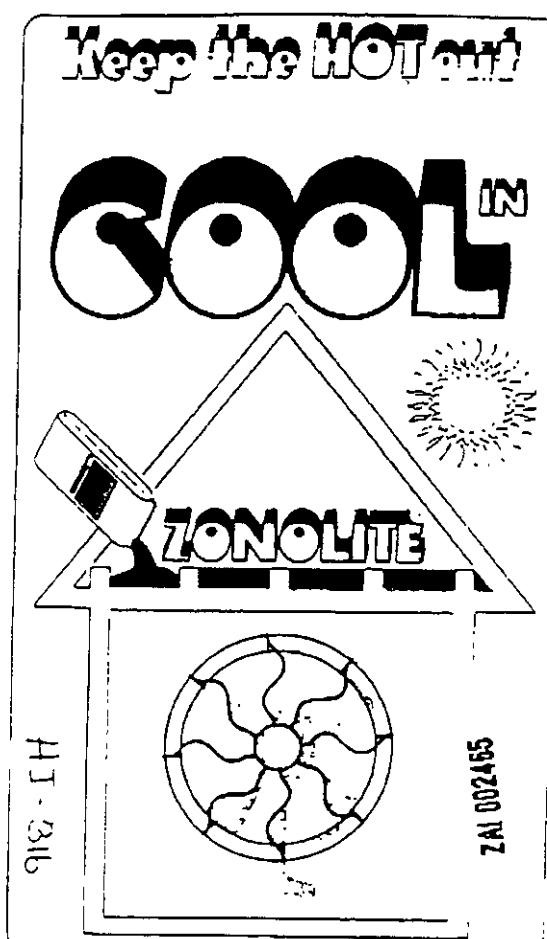
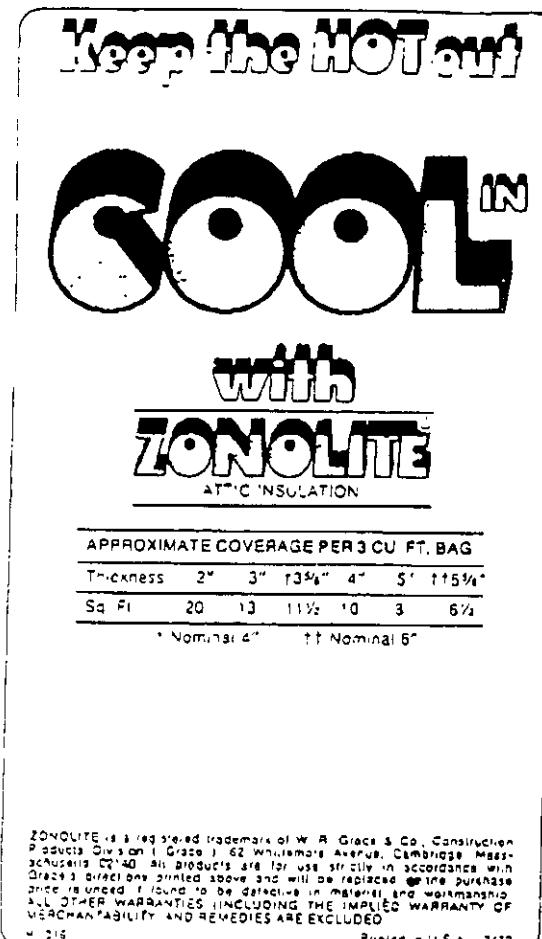
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Keep the HOT out



Your house can be 15 degrees cooler this summer by using Zonolite[®] insulation in your attic before the HOT arrives. Insulate during the leisure hours of your weekend. It's a family type fun project that will pay off in comfort and savings.

and the COOL IN

Zonolite is easy to install — just pour it right from the bag between attic joists, on top of old insulation or where there's no insulation at all. Six inches of Zonolite will ensure you years and years of snug, comfortable living — summer and winter.

Besides keeping summer heat out and winter heat in, ZONOLITE does not burn or attract vermin. Economical too . . . because savings in fuel and power costs can pay for the insulation in a few years. Get to your attic before the heat in your attic gets to you.

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ALL MINERAL
VERMICULITE
NET WEIGHT 12 POUNDS

GRACE
CONSTRUCTION PRODUCTS DIVISION

A Brighter Look, For More Insulation Sales

Pretty soon you'll be seeing a new face on our plastic bag. Yes, we've updated the Zonolite® Attic Insulation bag, and it's targeted at today's energy-conscious Do-It-Yourselfers.

Take a look. We've chosen an attention-getting warm red color to stop store traffic. The 'iron' has been uncluttered, and an attractive thermal graphic symbol added, along with a description of the contents . . . all-mineral vermiculite.

And, what's more, the back of this new bag contains all the information your customers need . . . product benefits, installation instructions, plus an easy-to-use coverage and 'R' value chart.

This new bag is part of the 1979-80 Zonolite Merchandising Program, and it fits nicely into this year's point-of-purchase displays to really dress up your insulation section and help you sell more vermiculite attic insulation.

The change over has already started, so keep your eyes open and ask your Zonolite representative for more details.

GRACE
CONSTRUCTION PRODUCTS DIVISION

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MASONRY WALL INSULATION

Double (Cavity) Walls: Masonry walls can be very satisfactorily insulated by constructing a two-unit ("Cavity") wall, using two separate walls of tile or concrete block spaced $2\frac{1}{2}$ " or more apart. The cavity thus formed is filled with a very lean mix of Zonolite Concrete.

Lay up 3 or 4 courses of inside wall. Apply an asphalt paint as a vapor barrier to cavity side of this wall. The paint can be applied with a brush or sprayed on. Lay up outside wall to same level, and place necessary wall ties. Place Zonolite Concrete in cavity as soon as mortar used in laying up blocks has become thoroughly set. Zonolite Concrete should be rodded into cavity as each 3 or 4 courses of masonry are laid up.

Single Unit Walls: Concrete block walls can be insulated by filling the cores of the blocks with Zonolite Insulating Concrete. Due to the conductance through the solid portion of the block, this wall does not provide as much insulation as the double cavity wall described above, but provides approximately twice as much insulation value as the wall with the cores left open.

The 1-to-16 mix is recommended for masonry walls:

1-to-16	4 bags Zonolite Concrete Aggregate
Mix	1 bag Portland cement
	48 gals. Water (Approx.)

This mix will cover approximately 76 sq. ft. $2\frac{1}{2}$ " thick.

Mixing: For such installations, the Zonolite Concrete is more conveniently mixed in a mortar box, inasmuch as smaller quantities of concrete are needed at one time. A garden rake works well for mixing. To keep crew working continuously, tenders for the masons can mix up batches of Zonolite Concrete, and place it in the walls, following the masons.



Insulating cavity wall with Zonolite Concrete

ZONOLITE CONCRETE MILK COOLING TANKS

Zonolite Insulating Concrete makes an efficient, economical, insulated milk tank. The 1-to-3 mix is recommended:

1-to-3	$\frac{1}{4}$ bag Zonolite Concrete Aggregate
Mix	1 bag Portland cement
	4 $\frac{1}{2}$ qts. Zonolite Waterproofing Admix
	9 gals. Water (Approx.)

This batch will make approximately 3 cu. ft. of concrete.

Zonolite Waterproofing Admix is specified in order to make a more waterproof concrete, particularly

important in a milk-cooling tank.

Mixing Directions: When Zonolite Waterproofing Admix is used, place correct amount of water in mixer, then the Admix, followed by the Portland cement. Mix slightly. Add Zonolite Concrete Aggregate, and mix to uniform and pourable consistency. Place promptly.

Walls of milk tank should be 8" thick, and reinforced with wire netting, as well as steel rods spaced 12" on center. Interior of tank should be painted with a good waterproof coating.

ZONOLITE INSULATING PLASTIC

(Covered More Completely in Folder G-23)



Zonolite Insulating Plastic is used principally by householders for insulating hot water tanks, furnaces, boilers, hot water and steam pipes, chimney flue openings, and stoves. It comes ready-mixed and needs only the addition of water.

Zonolite Insulating Plastic will stick to any clean surface without wrapping or reinforcing. It is fire-

proof and permanent, and can be easily applied with a trowel or the hands.

The formula is:

2 parts Zonolite Insulating Plastic
1 part Water, by volume
Warm water accelerates plasticizing.

One bag of Zonolite Insulating Plastic will cover approximately 12 sq. ft. $\frac{1}{2}$ " thick.

ZONOLITE REFRIGERATION INSULATION

(Covered More Completely in Cold Storage Manual CS-1)

Due to many special problems encountered in cold storage work, it is desirable that a competent refrigeration engineer be consulted for such installations. Our Engineering Department will be glad to advise regarding the use of Zonolite products.

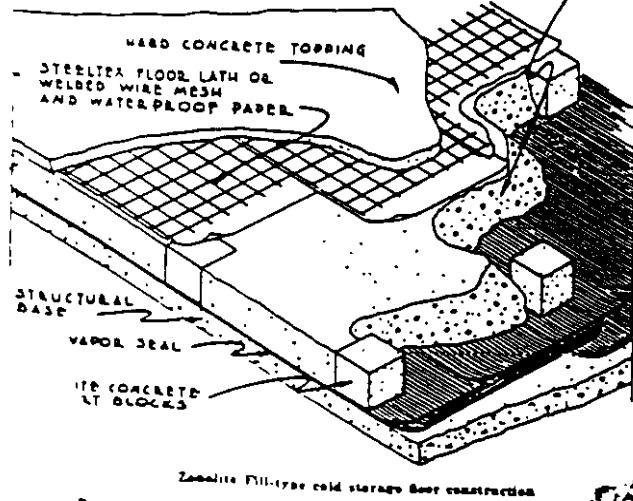
The following table shows minimum and recommended thicknesses of Zonolite Refrigeration-size Fill for temperatures to be maintained. The thickness of insulation affects the size and cost of refrigeration equipment. Cost of operation of a cold storage plant is also proportional to the thickness of insulation. The greater the thickness of insulation, the less will be the original cost of equipment, and the lower will be the operating cost. The refrigeration engineer who designs the installation can determine what insulation thickness will give the most practical and economical result. Zonolite is so inexpensive and easy to install that greater thicknesses can be economically used.

Temperature	Walls, Ceilings, Floors Above Ground		Floors on Ground	
	Minimum	Recommended	Minimum	Recommended
Above 50°	2"	4"	2"	3"
60 - 35	3"	5"	3"	4"
35 - 20	4"	6"	4"	5"
20 - 10	5"	8"	4"	6"
10 - 0	6"	10"	5"	8"
0 - -10	7"	12"	5"	8"
-10 - -20	8"	13"	6"	8"
Below -20	9"	14"	6"	8"

Zonolite Fill Cold Storage Floors with Pre-cast Zonolite Concrete Blocks: Zonolite Refrigeration-size Fill may be combined with pre-cast Zonolite Insulating Concrete blocks for insulating cold storage floors.

If the floor is to be built on the ground, place a 3" structural slab over a well-drained gravel fill. Best results can be obtained by constructing the structural floor above the ground, providing air circulation below the floor. Over the structural floor, apply the vapor barrier. Place pre-cast Zonolite Concrete blocks, at least 6" by 8" in cross section, spaced 2 ft. on center both ways. Blocks should be as high as needed to provide thickness of insulation required. After blocks are set in place, pour Zonolite Refrigeration-size Fill level with top of blocks. Roll waterproof paper over

ZONOLITE REFRIGERATION FILL



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Zonolite to keep insulation dry while placing concrete. Place a structural concrete slab 3" thick. The structural slab should be reinforced with a 6" by 6" by 10 gauge reinforcing mesh. Two sizes of Zonolite Concrete blocks, 6" by 8" by 10" or 8" by 10" by 12" are suitable for Zonolite Cold Storage floor installations.

For Zonolite Concrete cold storage floors, see p. 9.

Installing Zonolite Refrigeration-size Fill in Side-walls and Ceilings: When Zonolite Refrigeration-size Fill is poured into walls or sloping ceilings, these areas must be vibrated or rodded during installation.

All types of wall construction must be built to eliminate any movement or bulging which would permit settling of the insulation. In hollow masonry construction, all interior joints should be carefully filled with mortar to prevent sifting of the Zonolite Fill into the cores.

Side-wall insulation should connect directly with ceiling and floor insulation, so that no breaks or joints occur. The use of balloon-type construction having no plates or fire-stops at the ceiling and floor line makes it possible to install Zonolite Refrigeration-size Fill so that wall, ceiling, and floor insulation is continuous.



Cavity wall showing vapor barrier

Cold Storage Vapor-Proofing: The vapor-proofing of any construction used for cold storage insulation is exceedingly important. Due to the wide difference in temperature between the inside and outside of the cold storage room, vapor pressure becomes great on the warm side of the walls, ceiling, and floor. Too much passage of moisture-vapor will result in condensation within the insulation. Moisture within the insulation reduces efficiency and increases operating costs.

There are two acceptable types of vapor barrier. Select the type most adaptable to the type of construction used.

(1) Two layers of glossy-surfaced, asphalt-imregnated paper with edges lapped 4" and sealed. (Treated Sisalkraft, Bird's Neponset, Ruberoid's Giant Sheathing Paper, or equal.)

(2) Two layers of tarred felt in three moppings of hot pitch.

The vapor barrier is placed only on the warm side of the insulation. Any cracks or openings in the vapor barrier, even though only the size of a nail hole, should be sealed. The heads of the nails which secure the vapor barrier to the studding should also be sealed.